

Section 961

GUIDELINES FOR SUPERPAVE GYRATORY COMPACTOR PROTOCOL**961.01 Scope**

This procedure provides guidelines for the Superpave Gyratory Compactors (SGC). The testing laboratory will be responsible for following these guidelines.

AASHTO STANDARD:

- T 312 Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor.
- R 35 Superpave Volumetric Design for Hot-Mix Asphalt

AASHTO PROVISIONAL STANDARDS:

- PP 47 Evaluation of Different Superpave Gyratory Compactors used in the Design and the Field Management of Superpave Mixtures

UDOT STANDARD SPECIFICATIONS:**961.02 Definitions**

961.02.01 UDOT Laboratory: Laboratory owned and operated by UDOT. Includes the central lab, four region labs and their associated field labs.

961.02.02 Consultant Laboratory: Laboratory performing acceptance or quality assurance work in UDOT's behalf.

961.02.03 Non UDOT Laboratory: Laboratory performing split sample verification or contractor verification for an entity other than UDOT with the results being used to compare to a UDOT or UDOT consultant laboratory.

961.03 Process

961.03.01 Apparatus: Superpave Gyratory Compactor –As defined in T 312. Specimen Molds are as defined in T 312, Section 4.2 except the molds for the Bravold SGCs will have an inside diameter between 149.90 and 150.20 mm at room temperature.

961.03.02 Standardization: Items requiring periodic verification of standardization are listed in T 312 section 6. **UDOT and Consultant Labs:** Items requiring normal maintenance and

standardization will be attended to on a periodic basis according to equipment use. If an SGC is used more than moderately, (5 samples per week) the machine will be standardized, at a minimum, once prior to the construction season and once at mid season (no later than August 15).

All UDOT owned SGC's which are employed in testing, will be tuned up (repair to broken or worn parts) and standardized at least annually by factory trained service personnel. This service will include verification of the internal angle of gyration. **Non UDOT Labs:** All items requiring tune up and standardization will be attended to on at least an annual basis. **Non UDOT and Consultant Labs:** Adjustments will be accomplished according to manufacturers recommendations. Standardization may be accomplished using T 312 section 6 method A, B or the manufacturers recommended procedure using a mixless Dynamic Angle Validator. **All Labs:** All methods of angle standardization will be performed at $300 \pm 20^{\circ} \text{ F}$.

961.03.03 General Direction: The Brovold Gyratory Compactor (Test Quip or Pine) will be used as the standard SGC for Utah Department of Transportation HMA Acceptance Testing. Other gyratory compactors may be used if they correlate with the Brovold compactor. This may require using adjustment constants for each mix being tested. UDOT does not recommend different machines be adjusted to a custom angle for each mix. A single internal angle adjustment using a moderate mix stiffness should place the machines in close proximity at the center of the range. Use the procedures of 961.02.04 to verify correlation of the SGCs on a mix by mix basis. If a correlation with UDOT Brovold equipment is not possible after verifying sampling, splitting and testing procedures, the acceptance or verification lab will run a correlation with the UDOT Central Laboratory Brovold to investigate the problem. The UDOT Central Laboratory Brovold Compactor will be used as the standard, in a dispute situation.

961.03.04 Determining Adjustment Constants: For each project mix, 4 replicate specimens will be tested in the candidate SGC and the standard SGC. Samples will be prepared according to MOI 8-988 in a UDOT approved laboratory (asphalt) and compacted in accordance with T 312 to N_{des} . PP 47 methods will be used to evaluate the results of the candidate SGC and standard SGC. The precision and bias statement of PP 47 will be the basis for comparison of SGCs. If these results are not within the typical range for multiple labs but the candidate SGC provides G_{mb} results that are within the typical range for a single lab, the candidate SGC must use adjustment constants to bring the candidate SGC into the range of the standard SGC. Adjustment constants will be prepared for G_{mb} at both N_{ini} and N_{des} . The adjustment constant will be the difference between the average of the 4 replicate G_{mb} 's for each lab. I.e. (Lab 1 ($G_{mb1} + G_{mb2} + G_{mb3} + G_{mb4}$) / 4) – (Lab 2 ($G_{mb1} + G_{mb2} + G_{mb3} + G_{mb4}$) / 4). If a lab cannot achieve results within the typical standard deviation for a single lab, the single lab should verify the standardization of their equipment or consult the equipment manufacturer for service.

961.02.05 Documentation: Refer to section 4.1 and 6.1 of T 312. Documentation of each standardization will be maintained in the laboratory Quality Systems Manual (QSM), with a copy of the latest standardization displayed near the gyratory machine. Standardizations are to be documented in the QSM for not less than 3 years. The records of the yearly verification of the mold and platen dimensions and inside finish (performed by in house personnel) of the mold need

to be kept in the QSM for a period of not less than 3 years.